

53,098

Rec'd PCT/PTC 07 APR 2005

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau(43) International Publication Date
22 April 2004 (22.04.2004)

PCT

(10) International Publication Number
WO 2004/034065 A1(51) International Patent Classification⁷: **G01P 3/80**

Wen-Ruey [CN/US]; 8609 Deacon Avenue NW, North Canton, OH 44720 (US).

(21) International Application Number:
PCT/US2003/031601(74) Agent: **BOOKS, Mark, E.**; Polster, Lieder, Woodruff & Lucchesi, L.C., 12412 Powercourt Drive, Suite 200, St. Louis, MO 63131 (US).

(22) International Filing Date: 6 October 2003 (06.10.2003)

(25) Filing Language: English

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(26) Publication Language: English

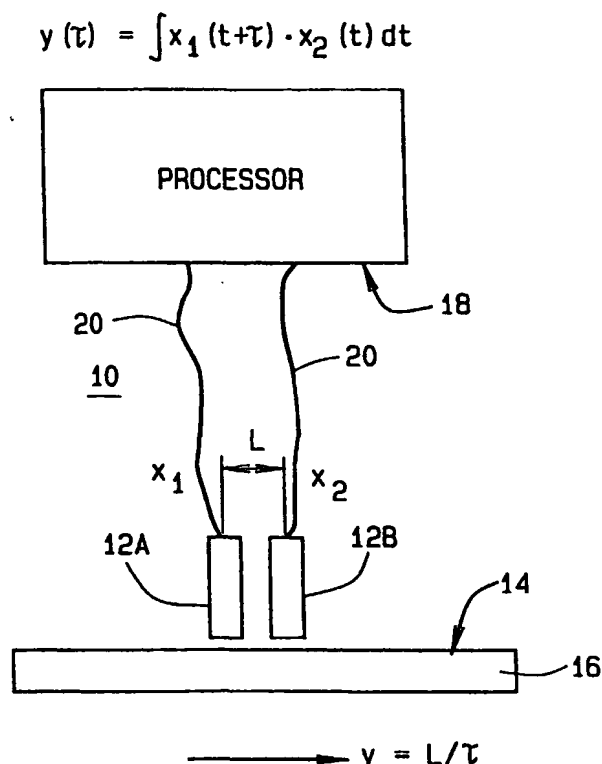
(30) Priority Data:
60/417,839 11 October 2002 (11.10.2002) US(71) Applicant (*for all designated States except US*): **THE TIMKEN COMPANY** [US/US]; 1835 Dueber Avenue S.W., Canton, OH 44706 (US).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **AI, Xiaolan** [US/US]; 4480 Noble Loon Street NW, Massillon, OH 44646 (US). **VARONIS, Orestes, J.** [US/US]; 1340 Irondale Circle NE, North Canton, OH 44720 (US). **HWANG,**(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: SPEED SENSING METHOD AND APPARATUS



(57) **Abstract:** A method and apparatus for measuring the speed of a target object passing a pair of sensor units (12) displaced apart by a predetermined distance L in the direction of motion of the target object (16). Passage of one or more features of the target object (16) past the first sensor unit (12A) results in the generation of a signal (x_1), and passage of the same feature of the target object (16) past the second sensor unit (12B) results in the generation of a second signal, (x_2). A signal processor (18) is configured to determine a mathematical correlation between signals (x_1) and (x_2), and an associated time delay (τ_0). The speed (v) of the target object (16) is calculated by the signal processor (18) as the ratio of the predetermined distance (L) to the time delay (τ_0).

WO 2004/034065 A1